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AMENDMENTS TO THE CLAIMS

Amended Claims

Please amend the Claims as follows:

1. (Currently amended.) A method ~~of motion capture~~ for capturing the position and movement of a subject living body comprising the steps of:

5 providing ~~an energy source~~ a transmitter (73); said ~~energy source transmitter~~ (73) disposed on a subject (12) at a location to be tracked; said subject (12) moving from position-to-position within a volume of space (16);

 emitting a signal (40) from said ~~energy source~~ transmitter (73);

 providing a plurality of widely-spaced receiving antennas (76, 78) disposed at edges of said volume of space (16);

10 measuring a phase difference ($\Delta\phi 1$) of said signal (40) being received at each independent pair of said plurality of receiving antennas (76, 78) when said ~~energy source~~ transmitter (73) is at a first position (72);

15 changing a physical position of said ~~energy source~~ transmitter (73) from a first position (72) to a second position (74);

 measuring a phase difference ($\Delta\phi 2$) of said signal (40) being received at each said independent pair of said plurality of receiving antennas (76, 78) when said ~~energy source~~ transmitter (73) is at a second position (74); and

20 estimating a change in said physical position of said ~~energy source~~ transmitter (73) by comparing measured phase differences ($\Delta\phi 1$, $\Delta\phi 2$) of received said signal (40) at each said independent pair of said plurality of receiving antennas (76, 78).

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2. (Currently amended.) The method as claimed in Claim 1, in which the step of providing a transmitter ~~an energy source~~ (73) disposed on a subject (12) includes the step of providing a low-power radio frequency transmitter (30) coupled to a marker antenna (14) on said subject (12).

3. (Currently amended.) The method as claimed in Claim 1, in which the step of estimating a change in said physical position (72, 74) of said transmitter ~~energy source~~ (73) by comparing measured phase differences ($\Delta\phi$) of received said signal (40) at each one of said plurality of receiving antennas (76, 78) further includes the steps of:

measuring a signal phase (ϕ) at each one said widely spaced plurality of receiving antennas (76, 78) when said subject living body (12) is at a first position;

moving said transmitter ~~energy source~~ (73) with said subject living body (12) from said first position (72) a distance (82) to said second position (74);

measuring a change of said received signal phase ($\Delta\phi$) at each of said widely spaced plurality of receiving antennas (76, 78) when said energy source is at said second position (74);

estimating the direction of motion and the distance ~~moved~~ 82 moved by comparing said measured change of received signal phase ($\Delta\phi$) at said widely-spaced plurality of receiving antennas (76, 78); said received signal phase (ϕ) being dependent only on a signal wave length (λ) and said distance and direction moved (82) by said transmitter ~~energy source~~ (73); and

continuing said movement (82) and repeating said signal phase measurements, thereby tracking the direction and motion of said transmitter ~~energy source~~ (73) without use of an absolute phase reference.

4. (Currently amended.) The method as claimed in Claim 1, in which the step of estimating a change in said physical position (72, 74) of said transmitter energy source (73) by comparing measured phase differences ($\Delta\phi$) of received said signal (40) at each one of said plurality of receiving antennas (76, 78) further includes the steps of:

measuring a signal phase difference ($\Delta\phi$) of received said signal (40) at each one of said widely spaced plurality of receiving antennas (76, 78);

evaluating all allowable values of a difference of pairs (Δn) of integer values (n_1, n_2) which give the same said measured value of said signal phase difference ($\Delta\phi$);

selecting a set of said values of a difference of pairs (Δn) of integer values (n_1, n_2) for which surfaces of all hyperbolas of revolution which are defined by said difference of pairs (Δn) of integer values (n_1, n_2) intersect at a same point; and

said same point of intersection being said physical position (74) of said transmitter energy source (73) at the time of said signal phase difference ($\Delta\phi$) measurement.

5. (Currently amended.) The method as claimed in Claim 2, in which the step of emitting a signal (40) from said transmitter energy source (73) includes emitting a microwave signal (40) from said marker antenna (14).

13. (Currently amended.) An apparatus for capturing the position and movement of a subject living body comprising the steps of:

5 ~~a transmitter~~ ~~an energy source~~ (73); said ~~energy source~~ (73) disposed on a subject (12) at a location to be tracked; said subject (12) moving from position-to-position within a volume of space (16); said transmitter ~~energy source~~ (73) emitting a signal (40);

a plurality of widely-spaced receiving antennas (76, 78), each one of said plurality of receiving antennas (76, 78) being disposed at edges of said volume of space (16);

10 a phase difference ($\Delta\phi 1$), of said emitted signal (40) being measured at each independent pair of said plurality of receiving antennas (76, 78) when said transmitter ~~energy source~~ (73) is at a first position (72);

15 a phase difference ($\Delta\phi 2$), of said emitted signal (40) being measured at said independent pair of said plurality of receiving antennas (76, 78) after moving said transmitter ~~energy source~~ (73) from a first position (72) to a second position (74); and

20 a change (82) in said physical position (72, 74) of said transmitter ~~energy source~~ (73) being determined by comparing a change in said measured phase difference ($\Delta\phi 2 - \Delta\phi 1$) of received said signal (40) at each said independent pair of said plurality of receiving antennas (76, 78).

14. (Currently amended.) The apparatus as claimed in Claim 13, in which said transmitter ~~energy source~~ (73) disposed on a subject (12) includes a low-power radio frequency transmitter (30) coupled to a marker antenna (14).

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15. (Currently amended.) The apparatus as claimed in Claim 13, in which:

the direction of motion and the distance moved (82) by said transmitter energy source (73) being dependent only on a signal wave length (λ) and a change of relative phase of the received, propagated signal (40); and

5 said measurements being repeated as said movement (82) continues, thereby tracking the direction and motion of said transmitter energy source (73) without use of an absolute phase reference.

16. (Currently amended.) The apparatus as claimed in Claim 14, in which said emitted signal (40) from said transmitter energy source (73) includes a microwave signal (40) from said marker antenna (14).

19. (Currently amended.) A method of ~~motion capture~~ A method of motion capture for capturing the position and movement of a subject living body comprising the steps of:

5 providing a transmitter ~~an energy source~~ (102); disposing said transmitter ~~energy source~~ (102) on a subject (12) at a location to be tracked; said subject (12) moving from position-to-position within a volume of space (16);

 emitting a signal (40) having a wavelength (λ) from said transmitter ~~energy source~~ (102);

10 providing a plurality of widely-spaced receiving antennas (108, 110) disposed at edges of said volume of space (16);

15 representing a length (d) of each signal path (104, 106) from said transmitter ~~energy source~~ (102) to each one of said plurality of widely-spaced receiving antennas (108, 110) as an integer number (n) of said signal wavelengths (λ) plus a fractional signal wavelength (δ); a difference in signal path length (Δd) to each one of any pair of said plurality of widely-spaced receiving antennas (108, 110) being characterized by a difference of said integer numbers (n1-n2) multiplied by said signal wavelength (λ) plus

20 a difference in said fractional signal wavelengths ($\delta_1 - \delta_2$);

25 assuming a plurality of values of integer number difference (Δn), a first said integer number difference (Δn_1) being characterized as a first integer value (n1) less a second integer value (n2), a second said integer number difference (Δn_2) being characterized as a third integer value (n3) less a fourth integer value (n4) and so on, for each value of integer number difference (Δn) possible within said volume of space (16);

30 measuring a phase difference ($\Delta \phi$) between each said signal (40) received from said transmitter ~~energy source~~ (102) at each said pair of said plurality of receiving antennas (108, 110); each one of said plurality of values of integer number difference (Δn) and each said measured phase difference ($\Delta \phi$) defining a surface of locations (112) upon which said transmitter ~~energy source~~ (102) may be located;

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5 selecting one of said plurality of values of integer difference (Δn) for each pair of said plurality of receiving antennas (108, 110) and calculating a potential ~~energy source~~ location (103) having a smallest mean square distance from all of the surfaces of location (112) defined by said selected values of integer difference (Δn) and said measured phase differences ($\Delta \phi$);

10 iterating said calculations of said potential energy source location using all of said assumed plurality of values of integer difference (Δn) possible within said volume of space (16) and finding each said ~~energy source~~ position (103) until a final absolute ~~energy source~~ position (103) is found at which a smallest said mean square distance from corresponding said surfaces of location (112) exists.

23. (Currently amended.) The apparatus as claimed in Claim 22 19, in which said transmitting means (73) includes a low-power, radio frequency transmitter (30) coupled to a marker antenna (14).

24. (Currently amended.) The apparatus as claimed in Claim 23, in which said emitted signal (40) from said transmitter ~~energy source~~ (73) includes a microwave signal (40) emitted from said marker antenna (14).

Claims for Cancellation

Please cancel Claims 21, 22, 30 and 31 without prejudice.